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TRAINING NEEDS ASSESSMENT FOR OFFICE AUTOMATION

Concepts and Models

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L'analyse de besoins de formation en
contexte bureautique: concepts et modèles

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FOREWORD

This research was prompted by a twofold observation: first, needs assessment is today attracting tremendous interest and more and more managers are attaching importance to it, at least in principle. As well, there is currently much confusion regarding the term "needs assessment". What does it mean exactly and, more important, how can an effective needs assessment be carried out?

Such questions become even more pressing in training situations, where needs assessment is increasingly seen as an essential stage. What, if any, are the specific characteristics of an assessment of training needs?

If we look at training in the area of office automation, we see that an additional aspect has been added to the problem. Will training aimed at mastering computer tools in turn mark the needs assessment process and, if so, in what way?

Considerations such as these have led us to survey existing documentation on the subject and produce a research report. This document thus has two purposes, to describe the basic concepts related to needs assessment and then to develop the broad outlines of a model to analyse office automation training needs. The first two sections will discuss some key concepts and then present several models of needs assessment. The third part will sketch a model specifically applicable to training in office automation.

This report is not intended as a complete summary of all existing work on the subject. We have deliberately chosen only those authors whose contribution we felt was particularly influential or whose remarks could be related to the problem referred to above. The bibliography annexed hereto should therefore not be considered exhaustive.

PART I

DEFINITION AND CHARACTERISTICS OF NEEDS ASSESSMENT

In this first part, we will define certain terms and then expose four key concepts that will give us a better idea of what characterizes needs assessment.

Some terms

A **need** may be defined as "a want of something requisite, desirable or useful". Human beings are motivated by many needs at various levels, as Maslow (1970) showed in his famous hierarchy of needs.

The concept of need is thus basically linked to that of a lack: where there is complete satisfaction, need no longer exists. From the standpoint of needs assessment methodology, however, it is interesting to note that this concept shifts to a meaning diametrically opposed to that of requirement, desire, aspiration or expectation, to the point where some authors then define need as a sought-after situation or ideal state. "In the context of Needs Assessment Methodology, a 'need' is a concept of some desired set of conditions; a 'need' is a concept of what should be." (Coffing & Hutchison, 1974, p. 3).

If need represents a desired or optimum state, partial satisfaction of this need may come from the present situation ("need fulfilment refers to the status of what is' "). This of course results in a discrepancy which must be accurately defined. All authors emphasize the importance of this discrepancy as a central concept in needs assessment. Analysing needs would then consist in measuring the discrepancy between a desired situation and the current situation.

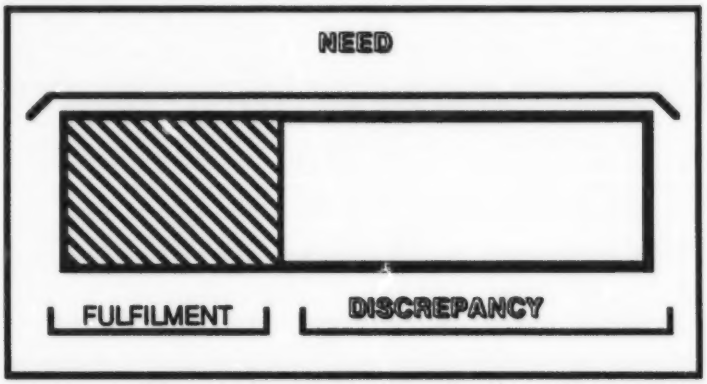


Figure 1 A need as a discrepancy

"A need is present when there is a discrepancy or gap between the way things 'ought to be' and the way 'they are'" (Burton & Merrill, 1977, p. 24).

"Needs assessment is the systematic search for details about the discrepancy between 'optimals' and 'actuals'" (Rossett, 1989, p. 57).

"The 'state-of-need' is the individual's or organization's awareness of a gap between an existing situation and a desired or necessary situation" (Fernandez, 1988, p. 37).

It thus seems clear that needs assessment will look at both the future and the present. Depending on the viewpoint adopted, it will be possible to use a deductive or an inductive approach. In the first case, we work back from the goal and measure the distance between this goal and the current situation. In the second, we take the present situation as our point of departure to determine what we would like to have. The deductive approach is the more common, particularly in the training field, and we will refer mainly to it in the pages that follow.

Another distinction is that there are several types of needs. We may speak of normative needs (in terms of an external norm), comparative needs (inequality between two similar sets), felt needs (based on individual perception), expressed need (the visible sign of a need), and anticipated needs (projected future needs) (Burton & Merrill, 1979). From this classification, we may deduce that needs may be determined on the basis of verifiable facts (e.g. number of complaints received, absenteeism, etc.), but they will also be seen at the perceptual level. Any needs assessment should thus consider both registers. We will come back to this essential point later on.

A last preliminary remark: although often associated with training, needs assessment clearly extends beyond this field. Needs assessment is in fact a problem-solving process applied to performance. This has been demonstrated by proponents of "Front-End Analysis" who are particularly concerned with efficiency and the benefits of the solutions adopted: "Front-end Analysis is problem solving applied to human performance... It is all the smart questions that a manger, educator, trainer and consultant should ask before deciding what specific solution to develop for a performance problem" (J.A. Harless). For Harless, the four key questions to be asked in a problem situation are:

a) Do we have a problem?
b) Is it a performance problem?
c) What is it?
d) How will we know when it has been solved?

Needs assessment and problem solving are thus areas that overlap to a great extent. This does not mean that the solution to the problem necessarily lies in training. If, for example, the causes of these problems are due to questions of motivation or work organization, only incentives (recognition or reward) or changes in the work environment will work. Training specialists know from experience that one of the first things to do when presented with a request for training is to check whether the problem is due to a lack of knowledge or skill, i.e. whether there is a real need for training. This might appear easy, but this is not always the case, since a problem may be due to several different causes. This is what makes needs assessment such an essential step. As J. H. Harless so succinctly phrased it (echoing the title of one of his books), "An ounce of analysis is worth a pound of objectives".

Some key ideas

Four basic concepts should be underlined:

1. Strictly speaking, training needs assessment must be done from the standpoint of end results, rather than that of means or processes

Roger Kaufman, director of the Center for Needs Assessment and Planning at Florida State University, notes the tendency in the education field to start with methods or processes, without first making sure what the goals are. He is of the opinion that this confusion is a result of the way in which educational technology has been developing over the past 25 years.

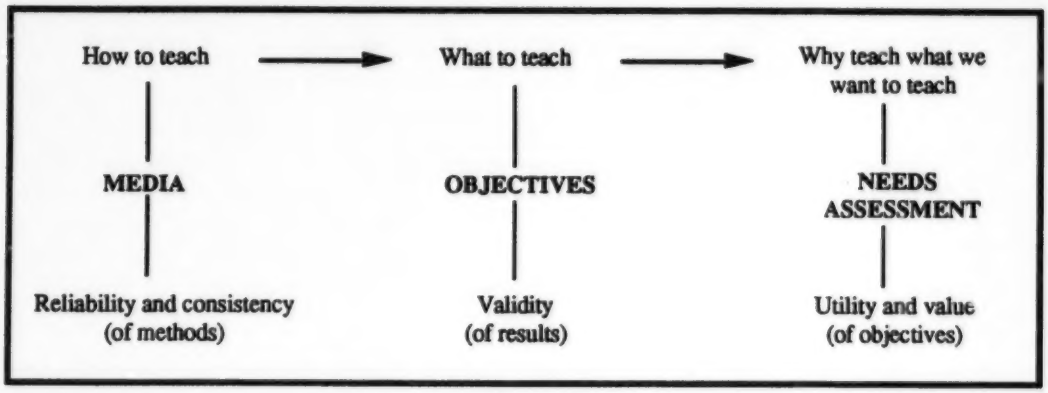


Figure 2

As shown, the accent first moved from the reliability of methods to the validity of results. This shift from the means to the end represented some progress, since using precisely defined specific objectives, it is possible to clearly determine where we want to go. In education, this was the era of teaching by objectives. But is not enough to set clear and measurable goals. We also have to be sure they are the right goals, goals that will increase the individual's skills and lead to better organizational performance. A new shift thus occurred from validity to utility, and this is best illustrated by needs assessment. As Kaufman points out, "validity speaks only to the accomplishment of objectives, utility adds the additional dimensions of the worthiness of the accomplishment" (Kaufman 1979:32). Today's organizations are particularly sensitive to the efficiency of any action, whether in training or organizational development, and it is thus not surprising to see increased interest in needs assessment, whether as a related to training or any other type of action.

This said, one of the great pitfalls that might be avoided at all costs when analysing training needs is this tendency to deal with both the means and the end at the same time. The resulting confusion will make identifying and analysing needs even more difficult. It should be borne in mind that other stages will follow, each with its own specific purpose.

2. Needs assessment should always be the first step

In any structured training process, needs assessment will be followed by several other stages. The table that follows shows two models for the overall process.

As shown, needs assessment should come before any other step, since it enables us to identify and understand the nature of the problem. But its true utility becomes clear with the subsequent steps, beginning with the definition of training goals (general and specific) (Stage 2). If time and money are short, there will of course be a temptation to skip this first stage and tackle the second, but we then run the risk of determining what should be done without having grasped the true nature of the problem, and this will necessarily yield inappropriate solutions in the long run.

So far, we have been looking mainly at **what**: What is the problem? What should be done in terms of training? "By preparing precise, measurable objectives, we may both define where they are going and how to know when the trip is completed: a focus on ends, not means." (Kaufman 1986:16) Stage 3 raises the question of **how**: this involves establishing a training strategy in terms of procedures to follow and means among which to choose. A natural extension of this development stage is the implementation of training activities (Stage 4). The last stage in the process, a summative assessment (Stage 5) may lead in some cases to a repetition of the process or the introduction of corrective measures. Kaufman also stresses the desirability of making any needed formative evaluations (Stage 6), which may refine the process as it is being developed. This concept is particularly important, because developing a training program is a complex task which involves a certain repetition of the process involved. It would be utopian to think that one linear run through the process will normally yield satisfactory results. It is sometimes necessary to backtrack and repeat some parts of the process. The same will be true of the needs assessment itself, which in most cases involves not one but several data-collection exercises.

It is interesting to note that, with the exception of the introduction of formative assessment, the models proposed by Roger Kaufman and Allison Rossett are quite similar. The only relatively minor difference is that Rossett calls Stage 2 the design stage, this term covering both objectives and strategy.

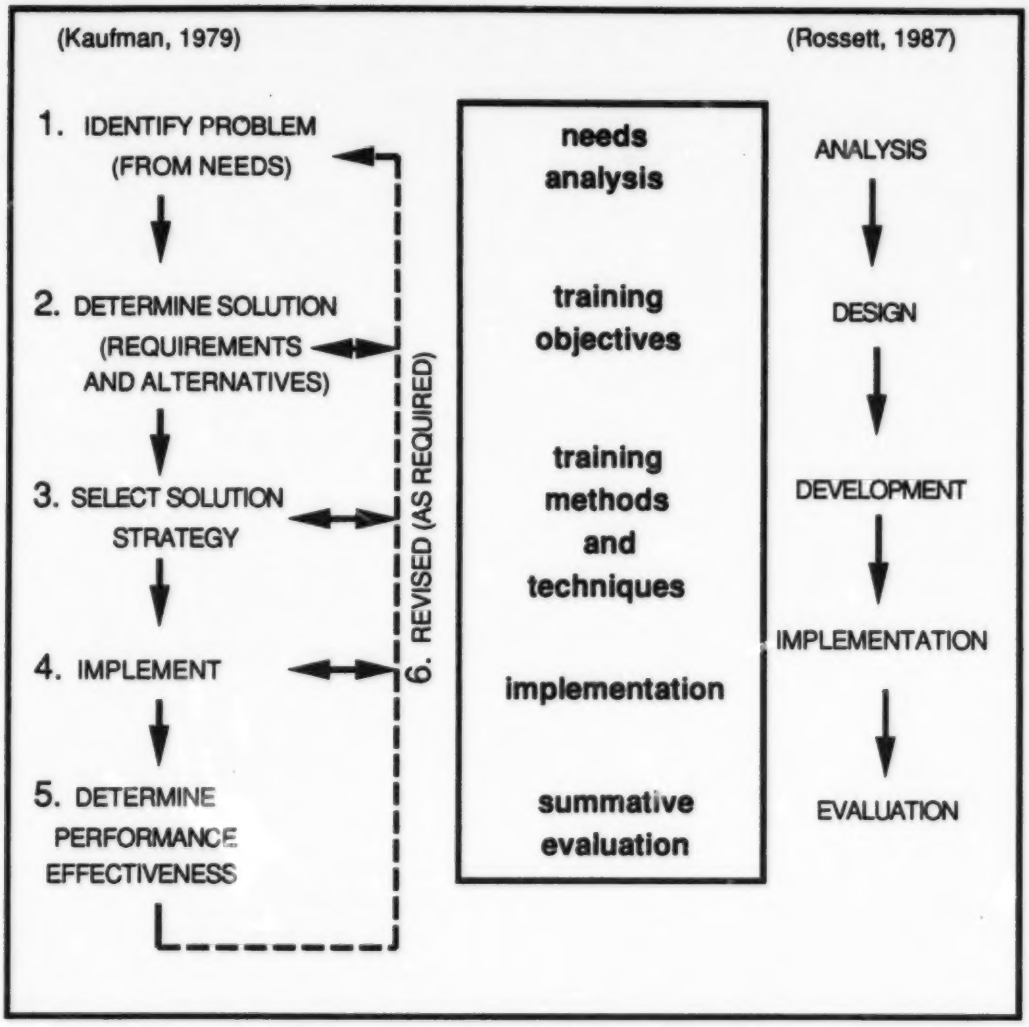


Figure 3 Needs analysis, the first step

3. Needs assessment in itself is a systemic process calling for the interrelation of a number of variables

The diagram on the next page gives us the broader picture of needs assessment seen as a problem-solving process related to performance. For Allison Rossett, needs assessment deals with five types of information. First, as underlined above, there is desired performance as opposed to current performance, indicating the gap to be filled. To this may be added the search for causes (Why this gap? What caused it?), yielding solutions to this problem (training? changes to work environment? motivation? etc.). Rossett then deals explicitly with looking to feelings and opinions as another type of information to consider. "Training Needs Assessment is the quest for what is and ought to be going on. It is also a systematic effort to find out causes, feelings and solutions." (1987:22).

Since it serves a number of different purposes, needs assessment will thus be a complex, demanding and necessarily iterative approach. We must expect to make several data collections and analysis, each time specifying a new objective in the light of results already obtained.

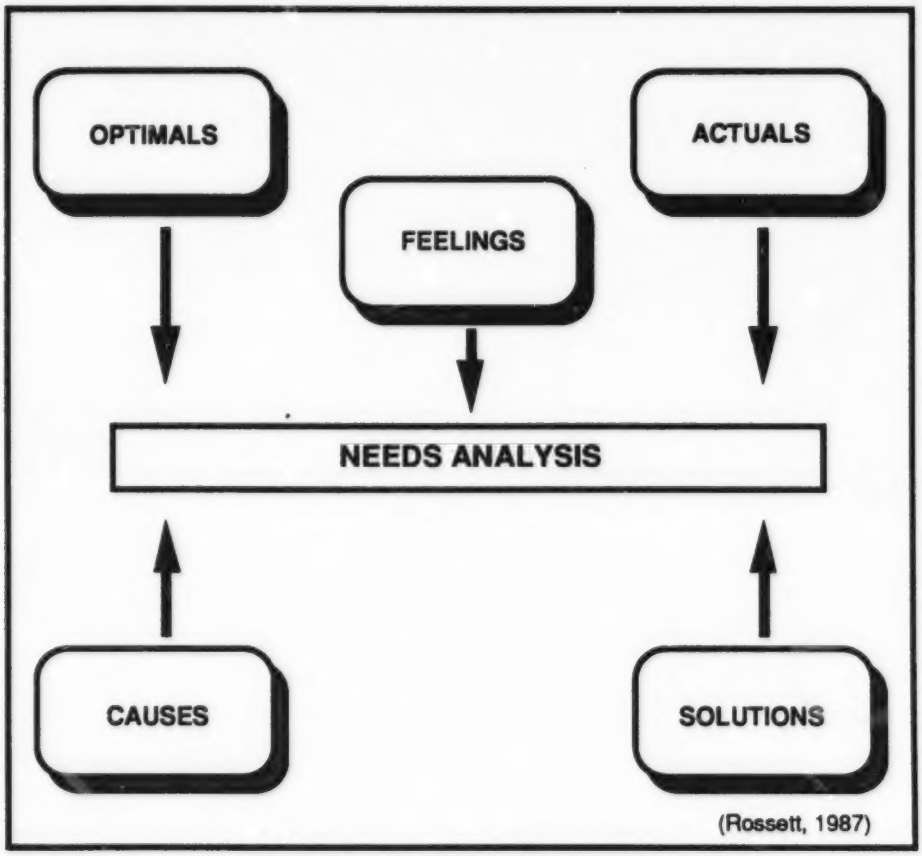


Figure 4 Systemic process

This said, Allison Rossett adds an important detail that links up with our own concerns: **the introduction of new systems or new technologies** calls for a different assessment of needs, since there is no performance problem as such to be identified and remedied. The accent will then basically be on OPTIMALS (desired skills and knowledge) as well as on the FEELINGS of those concerned regarding the planned change.

To obtain an even better understanding of what characterizes needs assessment, it might also be useful to distinguish it from other information analysis techniques (extant data analysis, subject matter analysis, task analysis).

As the diagram below shows, data analysis considers all existing information about the person's performance (e.g. sales reports). It looks not at what the employee does, but at the results of that action, and it is on the basis of these results that we determine the level of performance. Data

analysis is thus limited to the **present** situation without determining why there is or is not a problem. This information is not needed by the training specialist, but it might be of interest for reference purposes, such as guiding the needs assessment process.

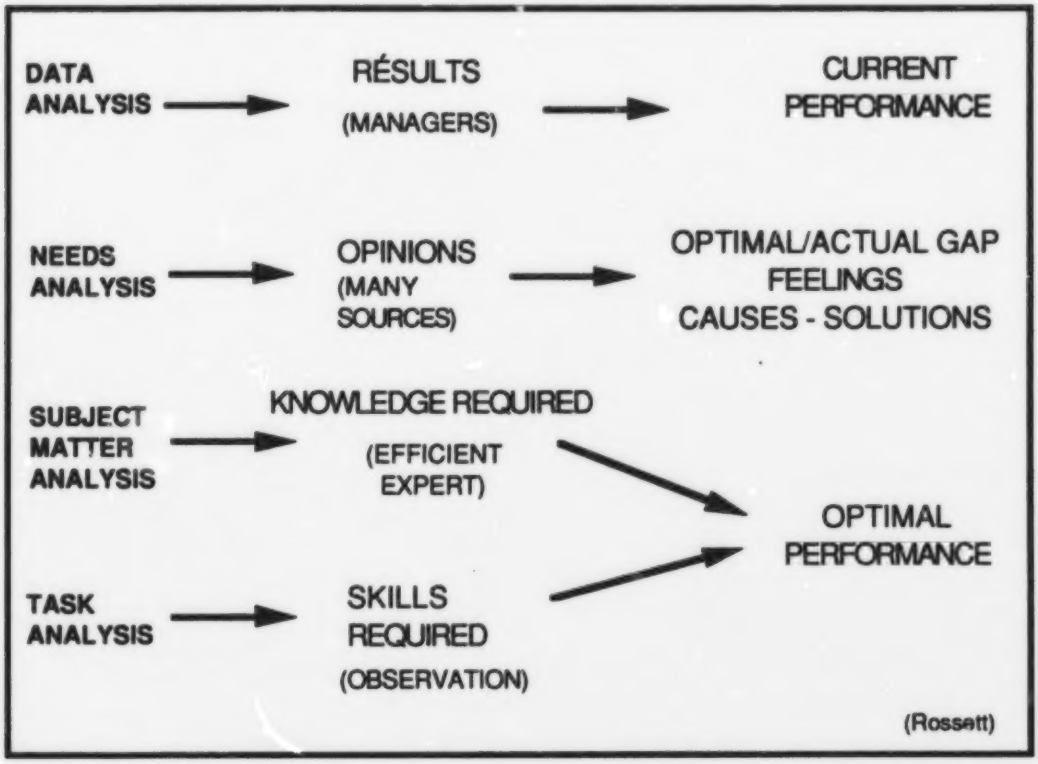


Figure 5 Information analysis techniques

Conversely, subject matter and task analysis are both oriented toward the **optimal** situation. They deal respectively with the details of knowing and the skill required to perform a task efficiently. "Just as task analysis leads us to optimals in visible job activities, subject matter analysis leads us to optimals in the invisible body of knowledge. Task analysis often uses observation to capture the best of what a master performer can be seen doing; subject matter analysis queries to represent what he or she knows" (1987:98).

4. Needs assessment may be done at various levels, depending on the scope assigned to it

This idea has mainly been developed by Roger Kaufman, who is a proponent of a holistic view of needs assessment and proposes considering five organizational factors and distinguishing internal and external needs assessment. The table below illustrates his thesis:

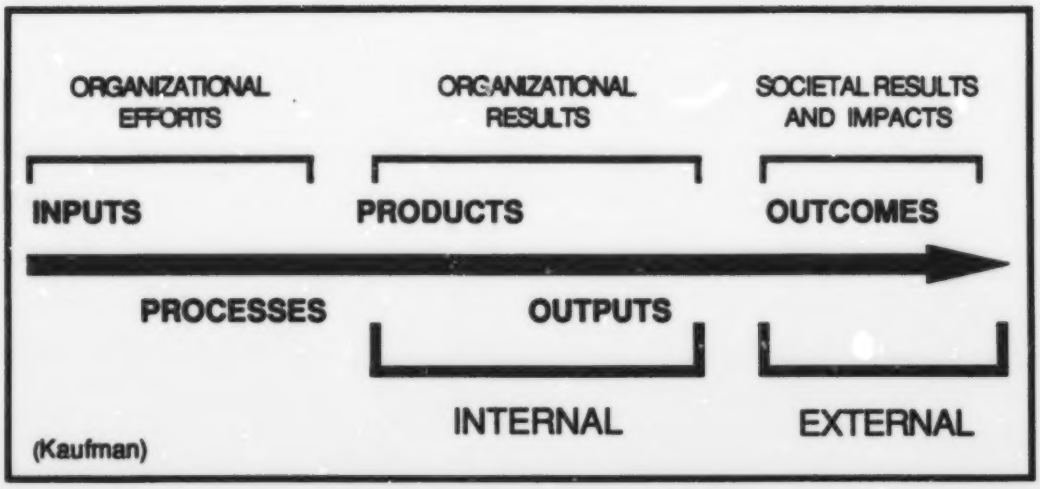


Figure 6 Needs assessment levels

The first organizational factor (INPUTS) covers all the resources that make the organization work, whether human, material or financial, while the second (PROCESSES) takes in methods, techniques, procedures and activities. Together, they make up the company's capital and include all organizational efforts made by the company.

There are three possible results: the first considers only the immediate results (PRODUCTS) of the action (report completed, item produced, skill acquired, etc.), while the second is broader and includes all products and services (OUTPUTS) generated by the organization (car delivered to customer, computer system installed, etc.). The **unit of change** will necessarily be greater, since instead of considering skill acquisition by an individual or small group, we are looking at the whole organization. These first two levels, also termed **middle** and **comprehensive**, make up internal needs assessment.

A third level of results, termed **strategic**, considers the outside contribution of the organization (OUTCOMES), its social impact (customer satisfaction, enhanced individual autonomy, etc.). To take an example using CWARC, a middle level needs assessment might lead to training DLR personnel in desktop publishing in order to produce better-quality research reports (PRODUCTS). A comprehensive needs assessment, on the other hand, might look at the whole problem of diffusing information generated by CWARC and, in addition to training people, envisage marketing strategies, advertising material, etc. (OUTPUTS). A strategic needs assessment would go even further, considering the office automation repercussions of CWARC publications on Canadian organizations (OUTCOMES).

In internal needs assessment, various aspects of the situation (overall goals, policy, operating regulations) are often considered as fixed. The validity and utility of established goals and objectives are then taken for granted. As a consequence, it is quite likely that any change introduced will have only a limited impact (e.g. on a given task) and will not modify the organization's objectives nor even its operating methods.

This is why Kaufman argues for more use of external needs assessment. It is only if we look at the needs of the organization and society as a whole that we can determine exactly where the organization wants to go, what social contribution it wants to make, and thus what new goods and services are likely to meet these needs. "The process for obtaining such a holistic frame of

reference and associated data base is an 'external' needs assessment: identifying and prioritizing 'outcomes' needs - gaps in societal consequences and payoffs. Based upon these gaps in results (needs), we may select and 'bundle' (or cluster) the correct individual organizational improvement tools and techniques which will get us from 'what is' to 'what should be'. This approach will not only improve our internal efficiency but also will define new outputs useful in a changing world." (1986:20).

Kaufman's remarks are of particular interest in that they correspond to certain concepts used in office automation with respect to gains resulting from workplace automation. It is clear that, for him, internal needs assessment will lead only to productivity gains (output/input ratio); only external assessment can lead to greater efficiency and above all innovation. "New requirements, new ideas and new innovations stem directly from wanting to close gaps in results, and especially gaps in society needs" (1986:19).

On the other hand, a needs assessment where the unit of change is not the individual (or a task performed by the individual), but the entire organization and its connection with society, can obviously not be carried out without senior management participation. This level must take the lead in determining the scope of the needs assessment, since the level of assessment selected may well be the result of constraints over which the training specialist has no control.

Allison Rossett clearly describes this situation in her more recent articles (1989) when she distinguishes between macro-assessment and micro-assessment. In "micro" situations, the scope of investigation is already determined, the field defined and the request is thus generally formulated quite precisely, e.g. a specific performance problem to be solved or the introduction of a new policy or technique. Conversely, in "macro" situations, priorities may not yet have been identified nor specific fields of investigation defined. Needs assessment is intended to reveal needs, expectations, problems and priorities (both for the individual and the organization) by examining each activity selected in terms of competence (how well employees can do it), critical dimension (how important doing it is for their job) and frequency (how frequently they are called upon to do it).

PART II

ASSESSMENT MODELS AND TOOLS

In this second part, we will present various needs assessment models, and then go on to look at assessment tools.

There are currently several models that show a number of different ways of assessing needs, but all have two things in common. First, they assume that there are two distinct operations: needs identification and needs assessment. There is thus always an information-gathering stage, followed by an evaluation of the information. Second, needs assessment implies choices that always lead to actions. In the case of training, this will obviously translate as the definition of objectives and selection of training methods.

We will look at three models in turn: the first, by Kaufman, is typical of the classical deductive approach. The second, by Allison Rossett, is to some extent an adaptation of this approach to the specific context of training, while the third, from Hiebert and Smallwood, differs significantly from the first two, having a distinctly non-traditional approach.

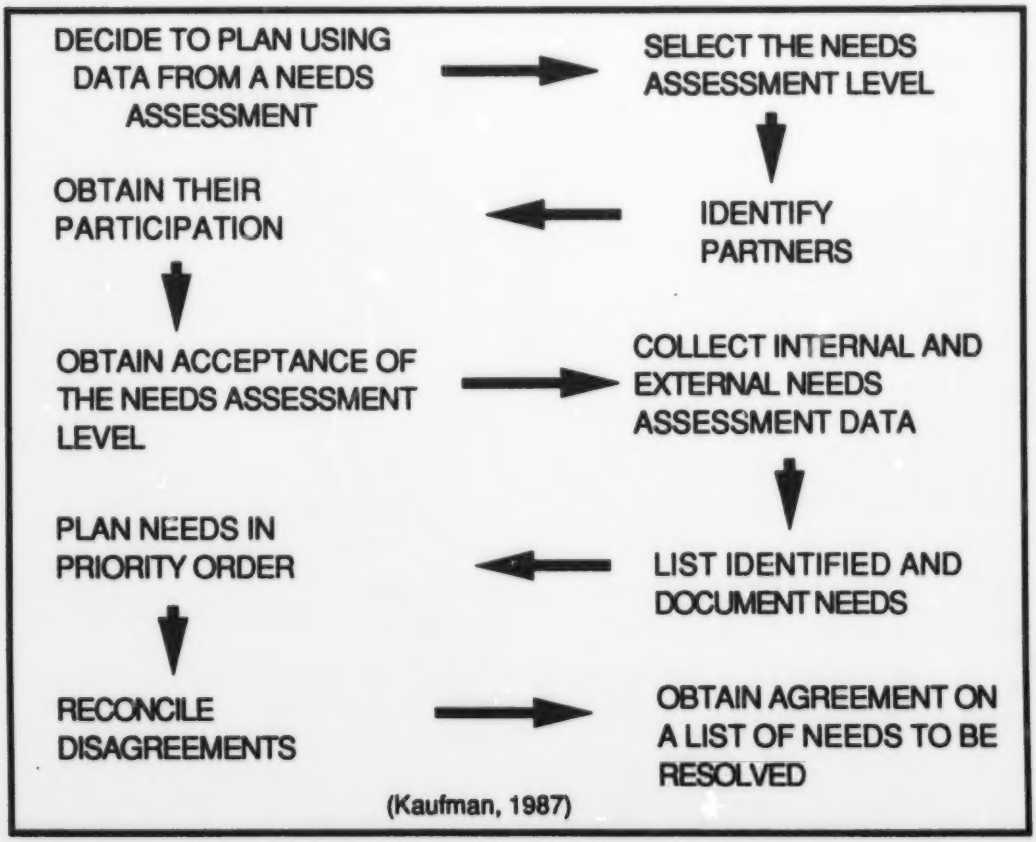

DECIDE TO PLAN USING DATA FROM A NEEDS ASSESSMENT
SELECT THE NEEDS ASSESSMENT LEVEL
IDENTIFY PARTNERS
OBTAIN THEIR PARTICIPATION
OBTAIN ACCEPTANCE OF THE NEEDS ASSESSMENT LEVEL
COLLECT INTERNAL AND EXTERNAL NEEDS ASSESSMENT DATA
LIST IDENTIFIED AND DOCUMENT NEEDS
PLAN NEEDS IN PRIORITY ORDER
OBTAIN AGREEMENT ON A LIST OF NEEDS TO BE RESOLVED
RECONCILE DISAGREEMENTS
(Kaufman, 1987)

Figure 7 A deductive approach to needs assessment

For Kaufman, needs assessment pre-supposes a deliberate decision: "Needs assessment is a substitute for good luck in determining where you should be going and why" (1987:78). This first stage seems all the more reasonable in view of the fact that needs assessment does not occur automatically. On the contrary, managers are often reluctant to allocate the needed time and resources. There must therefore be an explicit choice and consequently a pro-active attitude on the part of all concerned.

The next step is to determine the level of assessment based on the categories described above (see p. 9). If we opt for internal assessment, the level will be medium or comprehensive depending on whether it looks only at immediate results (products) or at all products and services (outputs). If we prefer external assessment, we will then be working more at the strategic level, which even looks at the impact on society (outcomes).

If the needs assessment is to be done properly and the results implemented, it is important to identify and ally good partners. This should be done by considering all groups concerned, those who will be doing the assessment, of course, but also those who will be affected by the results, whether directly or indirectly (e.g. outside clients). The group or groups formed should be representative of all the various main components making up the organizational context. As applicable, variables such as age, sex, type of personnel, field, rank, special technical skills, etc. should be taken into consideration.

If the make-up of the working group itself is highly important, those involved should be aware of the active role they will have to play and commit themselves explicitly in this connection. For Kaufman, there should be no hesitation in replacing people who fail to show up after the first meeting or participate only passively. In exchange, these individuals should be clearly informed of what needs assessments is and arrive at an agreement on the level of assessment to be performed. It is essential that the working group have a common understanding of the task to be performed and that it share the same expectations.

Next comes data collection. Kaufman reiterates here that two types of data should be sought: factual ((hard data) that provides a measurement of the gap between desired and actual performance. Here we might think of any relevant performance indicators: production rate, number of cases handled, personnel turnover, number of complaints received, return on investment, etc. This hard data is normally available in reports or computer files. The other type of data is perceptual (or soft) data, which comes from individuals and is based on perceptions, personal observation and feelings. Soft data can be gathered using questionnaires, interviews and small group encounters.

From this stage, we can go on to produce a list of needs identified and match up hard and soft data to determine points of agreement and disagreement. If necessary, data may be re-collected to complete or clarify the picture for needs where consensus is impossible. This is an arduous task for the group(s) involved, calling for perseverance and patience. Partners should also be reminded frequently that they must consider gaps in results and not means and resources.

Once all needs have been identified, it will be possible to evaluate them in order to classify them by order of importance. Kaufman proposes that the group or groups assign a value, monetary or other, to each need so as to determine what it would cost to satisfy it or, conversely, what it would cost to ignore it. Inevitably, some differences will arise, which may necessitate further data collection. The important thing is to pursue the process until all partners agree on a specific list of problems to be solved. This may seem cumbersome but, as Kaufman points out, "it seems less expensive to find out where an organization should be headed, why it should go there, and tailor interventions to accomplish this than it is to fail and have to determine what went wrong and try again. Needs assessment doesn't cost; it pays" (1987:83).

Roger Kaufman's model thus uses a deductive approach, basically starting with goals, from which needs are first identified, then evaluated in terms of importance. This classification results in setting up action priorities. We might criticize his model on two points: first, this is a general needs assessment model that as such does not answer the specific constraints of a training situation, and second, the model assumes that a large number of people will participate actively. Kaufman, along with Burton & Merrill, speak of a number of groups that will compare their respective results. But in a training context, it is often unrealistic to think of mobilizing so many people. Needs assessment should be handled by a specialist.

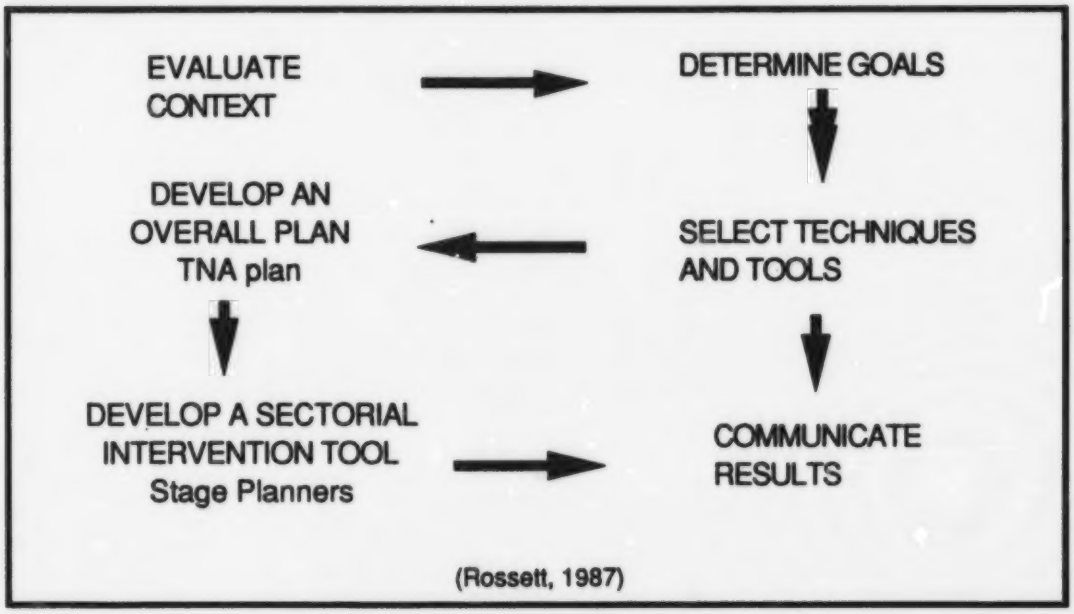


Figure 8 Stages of training needs assessment

Allison Rossett specifically attempted to adapt the classical approach developed by Kaufman to the training context. The above table illustrates her proposed approach.

Context evaluation, the first stage in the needs assessment process, assumes that we are answering several questions: Who is in favour of change? Who is opposed, or would at least prefer that the situation remains as it is? Is it a performance problem or the introduction of an innovation? What sources of information are available for the needs assessment? Are they accessible? What data can provide additional information? Is this accessible? Who supports this needs assessment? What support is needed to complete it? Who should be informed of the project and results?

The advantage to asking all these questions at the outset is that the needs assessment thus immediately becomes rooted in reality. It is then possible to determine whether it is a "micro" or "macro" situation (see p. 10). A clear view of the overall situation will also provide a better grasp of constraints (if only the limited time allowed by decision-makers) and thus allow for a better estimate of the resources needed.

Once the context has been evaluated, we can then go on to define the goals of the needs assessment by determining what information we plan to consider. A performance problem would lead the specialist to look at all types of information (see p. 7), whereas the introduction of an innovation

would limit research to the desired situation (optimals) and attitudes expressed about the proposed change (feelings).

Next comes the choice of data-collection techniques and the related tools. Kaufman spoke of hard and soft data, while for Rossett the former are the result of other activities such as data and task analysis (see p. 8). Goals will obviously influence the choice of techniques, but the context will also influence the choice of tools. Thus the nature and diversity of information sources and the time allowed for the needs assessment will motivate the use of a given tool (questionnaire, interview, etc.).

Once these decisions have been made, it is important to draw up an overall needs assessment plan listing the various types of data collection planned with, for each, sources of available information, possible constraints, objectives, and the techniques and tools to be used for gathering the data. Even if the plan may subsequently be modified, it serves two purposes: it provides a structure for studying the situation and gives a comprehensive view of the way to work through the various stages. Each of the stages is then described in detail using a tool Allison Rossett calls the TNA Stage Planner. This brings together all information on a given stage, based on six points:

- subject of needs assessment and stage number,
- summary of information already available on the subject,
- summary of information sought at this stage,
- sources of information for this stage,
- data-collection tool(s) for this stage,
- questions to be asked (interview or questionnaire) OR points to be observed, (observation) OR discussed (group encounter).

The overall plan and stage planner are, in our view, invaluable tools. They help the specialist structure a relatively complex process, and they remind him that needs assessment cannot be done in a single operation, but involves a series of stages in which it is possible to progress toward objectives based on information gathered in the previous stage. These tools will in particular help the specialist around two stumbling-blocks: getting off-target (e.g. by considering other aspects than those previously chosen) and unnecessary duplication in the various information collections (each stage should mark real progress over the previous one).

The last stage proposed involves communicating the results of the needs assessment. We have already mentioned the fact that, since it often has an impact on policy, needs assessment should have ample support from decision-makers. But this support must be maintained by informing decision-makers of progress made throughout the process and, at the end, they should receive a report on the results obtained.

This stage should be carefully planned, since "the essence of TNA is to ask hard questions about performance, accomplishment and responsibility. Absolutely nobody likes surprises about that kind of information" (1987:254). It should thus be clearly determined to whom and how the information should be communicated, but also why. Obviously the reason for this communication is to report on the results of the needs assessment, but it may also lead to decisions on what steps to take next, or at least provide an opportunity to make suggestions on this. The following aspects should accordingly be clearly underlined: Why was a needs assessment made? How was it done? What were the findings? What do they mean? In this way, it is possible to bring out the implications of findings and make recommendations based on them.

In May 1987, Murray Hiebert and Norman Smallwood published an article entitled "Now for a Completely Different Look at Needs Analysis". As the title suggests, the authors proposed a new approach quite different from the traditional method. Let us look briefly at this approach and how it differs from the first two.

For Hiebert and Smallwood, the traditional approach may be termed **objectivist** and is based on several fundamental assumptions: the goals of the organization are clear and relatively unchanging with respect to the tasks; these goals may be translated into clear training needs, and the behaviour needed to achieve these goals may be clearly defined and subdivided. What characterizes this approach is the certainty of being about to grasp reality because it is relatively stable and thus the needs and goals may be clearly defined. In short, the "true" training needs are there... we just have to find them.

But, they claim, reality is something else. The environment is made up of a dynamic flow of information. We give meaning to the environment by creating chunks of information ("we make sense out of it by 'bracketing' or 'punctuating' it into meaningful chunks"), and these chunks may be interpreted in more than one way, since they have no self-evident meaning. It is people who interpret them and give them meaning. These interpretations are necessarily socially and culturally determined, particularly since the people who interpret them are also part of the environment: there are no neutral observers; we are all participants.

Table 1

Comparison between objectivist and interpretative approach

OBJECTIVIST APPROACH	INTERPRETATIVE APPROACH
The needs are real and available, all you have to do is uncover them.	You can only collect needs as data points. There will be many ways of interpreting the data.
Assumes needs are relatively unchanging or you can predict changes.	Assumes environments are fluid and changing.
Focused mainly on the historical past and "official" future.	Focused on past interpretations and people's perceptions of the future.
Focused on logic, rationality, and content.	Focused on values, innovation, and contest.
Focused on measurement and programs (goals, skills breakdown, training courses, etc).	Focused on action and what is the best way of representing information.
Wants to get as "reality" and "truth".	Recognizes the inevitable ambiguity: learners will adapt will adapt to fit their own situations.
TRAINING = CULTURAL TRANSMISSION DEVICE	TRAINING = A WAY OF RENEWING THE ORGANIZATION

(Hiebert et Smallwood, 1987)

These are the postulates of another approach, termed **interpretative**. If we transpose these approaches to needs assessment itself, we see that the focuses are then quite different (see table above). In the interpretative approach, needs assessment becomes a process by which chunks of information are inter-related in an attempt to find a common interpretation. "Effective training needs analysis is the process of connecting fragments of information and activities of organizational life into a pattern and, with other participants, coming to some agreement on a common interpretation" (1987:77).

The authors admit the objectivist approach might be effective in training for skills that translate into easily identifiable behaviours, as in the case of technical training. But for more abstract fields, such as management, the objectivist approach has trouble dealing effectively with such a dynamic, changing environment.

In our view, the merit of Hiebert & Smallwood is thus to demonstrate the limitations of the traditional approach that seeks to classify everything and for which, in the end, what cannot be measured does not exist. This said, it is not proven that this approach is always used in such a pure form. The model proposed by Allison Rossett corresponds in many ways to the principles laid down by Hiebert & Smallwood. Where they suggest a cyclical rather than a linear approach, leading to a number of successive interpretations, she proposes an iterative process. They insist on the need to act before having full knowledge or an infallible model ("action which starts up on the way to an unclear goal is preferable to inaction until the goal is perfectly clear"); while the stage approach suggested by Rossett seeks to reduce the degree of uncertainty as the assessment process goes along. They stress the importance of hidden criteria often ignored in the traditional approach, while she gives greater importance to the exploration of feelings and constantly points out that needs assessment is based on opinions, as opposed to other methods of data collection. At the end of the 1987 article, Hiebert & Smallwood envisage an integrated model that would use the language and processes of the objectivist approach while maintaining the mindset of the interpretative model. They are not particularly explicit about this, but one might wonder whether such integration had not already been made, to a great extent, by Allison Rossett.

As emphasized above, needs assessment calls for the use of data-collection tools. We immediately think of the questionnaire, the most common method, or the individual interview, but other methods are telephone contact, the small working group (focus group), the Delphi group and the nominal group. All these tools have various advantages and disadvantages, and the table on the next page shows the more important of these.

As we can see, face-to-face contact usually gives the most complete and richest information, but this is difficult to process quantitatively. Conversely, the questionnaire lends itself to large-scale quantitative processing, but leaves little opportunity for free expression. Moreover, its value depends directly on how well it was drawn up, and this can be an extremely demanding exercise.

A number of authors have described in detail how to prepare an interview guide, write questionnaire items or plan a focus group. We mention only Allison Rossett (1987) and Rom Zemke (1985), whose books have several chapters dealing with such matters.

Table II

Advantages and disavantages of data collection tools

téléphone	individual interview	small working group	questionnaire	Delphi/ nominal group
+				
relative freedom	free expression	free expression	anonumity	detailed information
additional questions (follow-up)	additional questions (follow-up)	synthesis of viewpoints	quantitative results	expert opinions
économical	depth of information (experience)	group consensus emerges	large number of people	group consensus emerges
−				
limit to info. (time)	necessitates confidence	costly method (salaries particip.)	free expression restricted	rigorous approach and leadership
direct relation mediated	slow and costly method	result hard to quantify	low rate of response	relatively long and costly
	results hard to quantify		hard to construct	

PART III

CONCEPT AND MODEL FOR OFFICE AUTOMATION

In this last section, we will attempt to apply the concepts and models developed above to the specific context of training in the field of office automation. We use the term "office automation" in a very broad sense, taking in both the introduction of corporate computer systems installed in a mainframe computer and the proposed use on an individual basis of programs running on microcomputers. It might also include technological innovations using other instruments than the computer: specialized terminal, telephone (e.g. for voice messaging), fax machine, etc.

What distinguishes office automation training needs assessment from other similar types of assessment is of course the fact that a technological innovation is involved. Basically, needs assessment attempts to establish the best possible conjunction between not two but three elements: the individual, the task and the technology. This may be illustrated by the model on the next page.

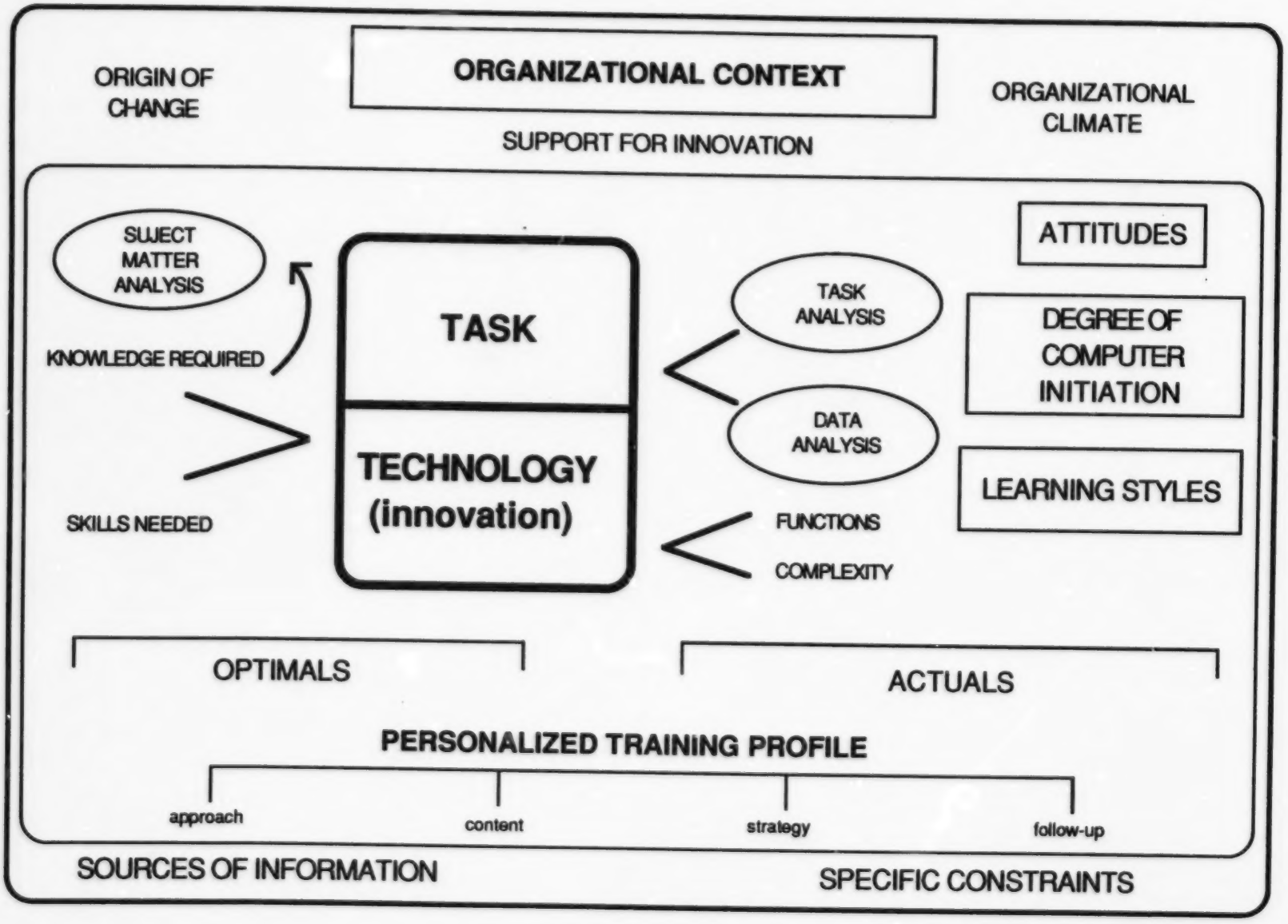
The model has the following main characteristics:

1) This is a "micro" needs assessment, since the field of investigation is already clearly defined. As well, the assessment is apparently internal, to use Kaufman's categories, in that it is limited to organizational results without taking into consideration the external effect on society. Insofar as possible, is does however go beyond simple immediate results (products) to place these in the overall context of goods and services generated by the organization (outputs).

2) Needs assessment thus considers first the organizational context as a whole, focussing on five main aspects:

   - the origin of change: the history of events that brought about the change, catalyst factors;
   - support for innovation: people who introduced or support the introduction of a technological innovation;
   - organizational climate: quality of working life, type of management, leadership methods;
   - sources of information: people who should be questioned during needs assessment, how to contact such people (authorizations);
   - specific constraints: mainly in terms of time and budget allocation.

3) Since a technological change is being introduced, needs assessment focusses on seeking the desired situation (optimals) as well as the attitudes of those concerned (feelings). For this we use Allison Rossett's approach.


ORIGIN OF CHANGE
ORGANIZATIONAL CONTEXT
ORGANIZATIONAL CLIMATE
SUPPORT FOR INNOVATION
SUJECT MATTER ANALYSIS
KNOWLEDGE REQUIRED
SKILLS NEEDED
TASK
TECHNOLOGY (innovation)
TASK ANALYSIS
DATA ANALYSIS
FUNCTIONS
COMPLEXITY
ATTITUDES
DEGREE OF COMPUTER INITIATION
LEARNING STYLES
OPTIMALS
ACTUALS
PERSONALIZED TRAINING PROFILE
approach
content
strategy
follow-up
SOURCES OF INFORMATION
SPECIFIC CONSTRAINTS

4) To better understand the desired situation, it would be advisable to make a subject matter analysis to round out the opinions gathered. What knowledge exactly is required to perform this task ideally? To what work skills does this knowledge correspond? In terms of technology, what functions does the proposed system offer users? How complicated is the system? What skills are needed to operate it?

5) Similarly, a task analysis and a data analysis will provide access to much factual data that can clarify the present situation, in particular the current level of performance and the gap between it and the desired level. All this information can be compared with the opinions gathered (soft data) and any disagreements then cleared up by gathering additional data.

6) It is also important to question people about their attitudes towards technological change to detect any possible resistance, reluctance or, conversely, desire for change. But this is not enough; it is also useful to measure their degree of familiarity with computer systems, their "computer literacy" and also to discover what their learning styles are. These are dimensions that are generally neglected in needs assessment, and this is unfortunate, because these factors will have a significant impact on the design of the training plan, in particular on training techniques. To our knowledge, only Ron Zemke (1985) attaches any importance to these aspects at the needs assessment stage, suggested short questionnaires to be used for this purpose.

7) Data collection will provide the information needed to draw up personalized training profiles based on four variables: approach (conceptual or instrumental), content (precise breakdown based on tasks assigned), strategy (self-training or group training with an instructor), follow-up (degree, frequency, type). Readers wishing further information on these aspects may refer to Effective Training for Office Automation, by the same author (CWARC publication, 1988).

This type of needs assessment will play its full part by resulting in training better suited to the specific requirements of each individual facing the challenge of dealing with change.

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